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**Fig.2**

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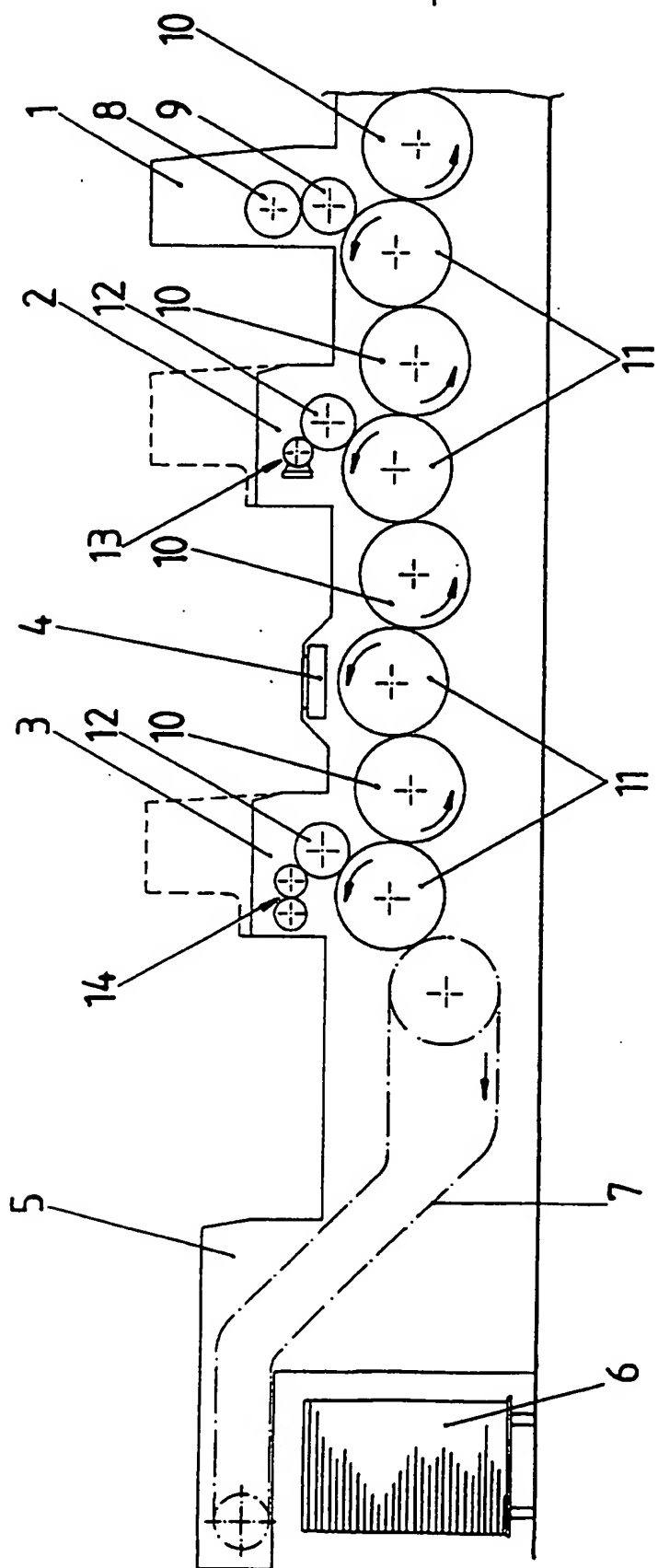


Fig.1

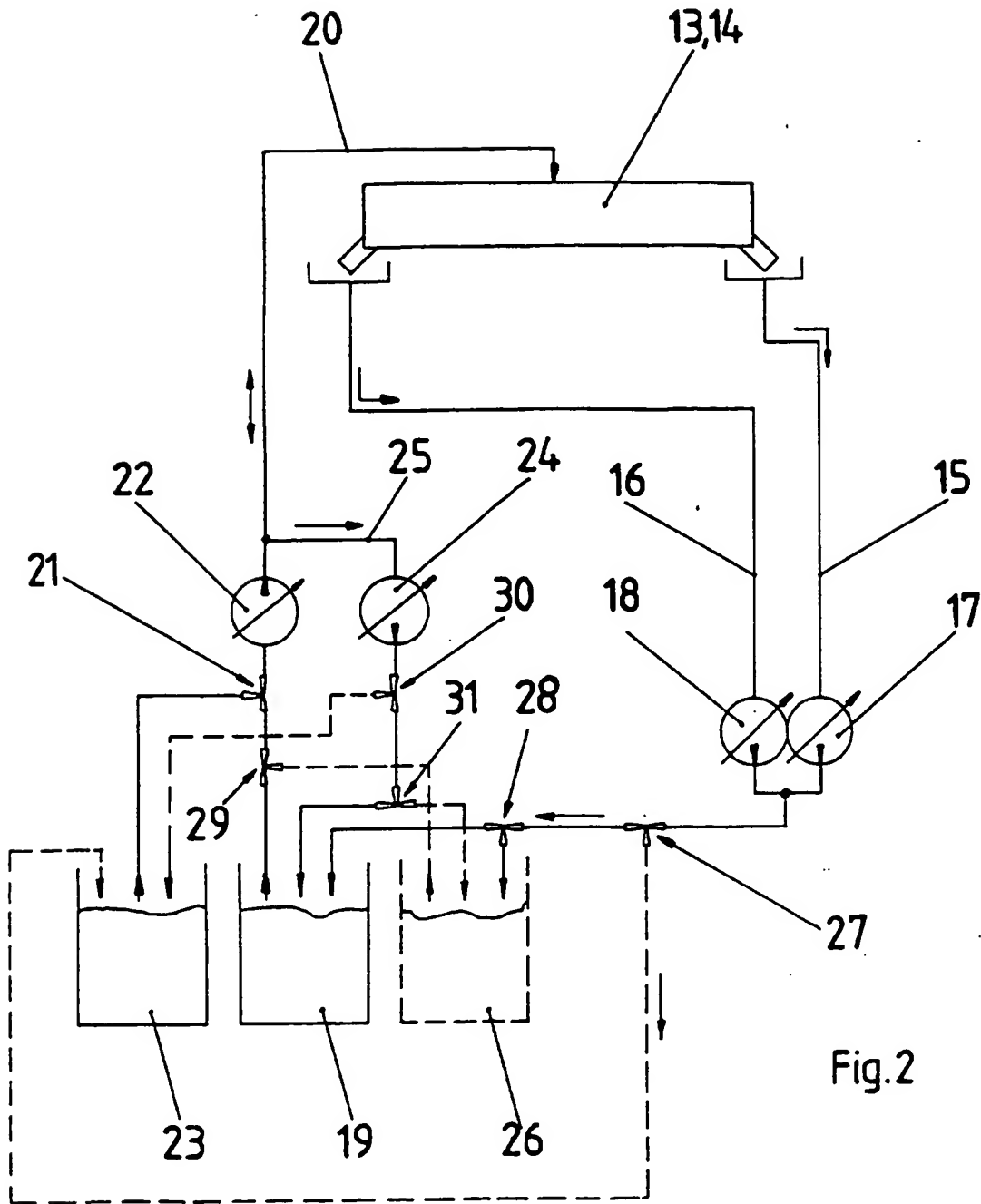


Fig.2

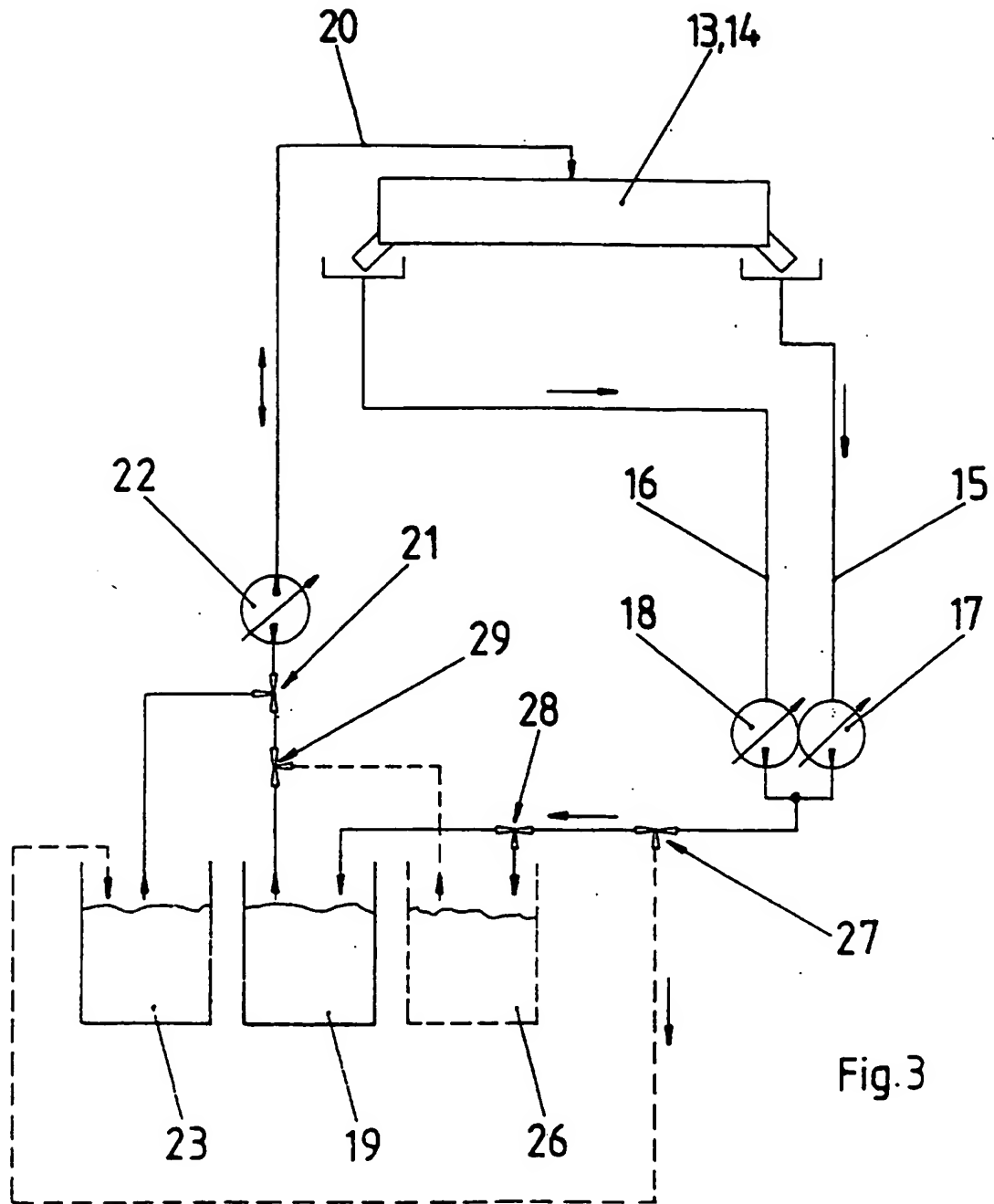


Fig.3

DEVICE FOR COATING PRINTED MATERIALS IN A PRINTING PRESS

This invention relates to a device for coating printed materials in a printing press.

5

A device of this type is known from EP 0 619 186 B1. In this specification, at least one operational unit is described which is constructed as a flexoprinting unit and has a sheet guiding cylinder, a forme cylinder as well as  
10 an applicator roller with a chamber doctor as a metering system. The metering system is functionally connected with a lead system with a reservoir, consisting of a previously arranged feed pump and a feed lead as well as a subsequently arranged suction pump and return flow lead. A  
15 coating medium, e.g. dispersion varnish, can be fed via the lead system to the reservoir which is present in the metering system at a slight excess pressure.

Furthermore, from EP 0 574 124 B1, a device is known for  
20 coating printed materials with a lead system in which the

coating medium in the metering system, here a chamber doctor, lies under reduced pressure and can be fed back by suction flow from the metering system.

5 In accordance with US 4,526,102, an ink circulation and washing system for a printing press is known. Two different inks from separate containers on the feed side can be fed separated via a discharge nozzle into a roller slot. The roller slot is formed by two parallel arranged  
10 inking rollers in accordance with the principle of nip rollers wherein the inking rollers are fitted to a plate cylinder. Arranged at the ends below the inking rollers are catch pans which, via return leads, connect a switching valve with the corresponding container for the respective  
15 ink on the lead side. The return of the ink takes place following gravitational principles back into the corresponding catch container. Via a special feed lead, cleaning liquid can be fed via several switching valves into the feed leads and return leads.

20

In devices which operate in accordance with the principle of gravitation, it is disadvantageous that when working with rapidly drying coating media (special effect printing inks, dispersion lacquers, UV lacquer), the leads clog and  
25 accordingly can be used only for special media.

Furthermore, it is of disadvantage on changing the respective medium to be worked with, even in cleaned components such as leads, pumps, that residues of the  
30 original coating material can stick or remain, even if a changeover ought to take place. There is then the danger that various coating liquids can be mixed one with another.

In the case of units with suction pumps for the return of excess coating medium back into the respective reservoir it is disadvantageous that on a change of the respective coating medium to be worked with, the residual coating medium located in the feed lead or still in the metering system can no longer be sucked off via the return lead. On cleaning the feed lead, the metering system and the return lead, mixing of coating media with a cleaning fluid can lead, in this connection, to unused coating medium becoming unusable. As well as the unnecessary loss of coating medium, there arises thereby further outlay for disposal of the mixture of coating medium and cleaning fluid.

The object underlying the invention is to create a device of the initially noted type which avoids the noted disadvantages, which especially notably reduces the use of coating medium and which diminishes the danger of mixing differing coating media.

In accordance with a first feature of the invention, there is provided a device for coating printed material in a printing press formed by a counter pressure cylinder, a forme cylinder, at least one applicator roller with a metering system which can be set on and off the forme cylinder, a reservoir for coating medium, a circulating lead system drivable by means of at least one feed pump for circulating coating medium in the reservoir, and wherein between the metering system and a feed pump, whereby coating medium can be fed from the reservoir via the feed lead to the metering system, a feed lead is arranged having a by-pass lead including a twist suction pump enabling medium to be fed back to the reservoir, and wherein excess

coating medium can be sucked off from the metering system via at least one return lead linked with a further suction pump into the reservoir.

- 5 In a second embodiment, the invention provides a device for coating printed materials in a printing press formed by a counter impression cylinder, a forme cylinder, at least one applicator roller with a metering system which can be set on and off the forme cylinder, a reservoir for coating  
10 medium, a circulating lead system drivable by means of at least one feed pump for circulating coating medium in the reservoir, and wherein between the metering system and the reservoir, a feed pump is arranged in a feed lead, which feed pump can feed the coating medium from the reservoir  
15 via the feed lead to the metering system and which can be switched over to act as a suction pump to enable coating medium to be fed back from the feed lead into the reservoir, and wherein the device includes at least one return lead linked with a suction pump for returning excess  
20 medium from the metering system to the reservoir.

- In each case, the forme cylinder carries, for example, a blanket or a flexible relief plate which can be brought into contact with a sheet guiding cylinder, e.g. an  
25 impression cylinder. Furthermore, the device includes an application roller which can be brought into contact with the forme cylinder as well as a metering system which can be brought into contact with the application roller. The metering system can, according to choice, be a chamber  
30 doctor standing in functional connection with the applicator roller, or a metering roller which is connected with the application roller, wherein the liquid coating



medium is fed via the roller nip. Alternatively, the metering system can also be constituted by a pan with a scoop roller dipping into it and if desired a metering roller which is functionally connected with the applicator  
5 roller.

Furthermore, a lead system is functionally connected with the metering system, wherein a feed lead is with a feeding pump is arranged upstream of the metering system and one or  
10 more return leads with suction pump(s) are arranged downstream of the metering system. As coating media for treating printed material, there are especially suited dispersion lacquers on an aqueous basis, liquid printing inks with or without metal pigments as well as UV lacquers.  
15 In order to achieve an economic use of the coating medium on a change of coating medium and a necessary cleaning process of the lead system, the excess coating medium located in the feed lead is first taken out of the feed lead into a suitable reservoir for the receipt of coating  
20 medium. Therewith loss of coating medium is avoided and simultaneously the use of coating medium notably reduced. Then the feed lead is cleaned with a cleaning fluid whereby the previous mixing up of coating medium and cleaning fluid is reduced and the use of cleaning fluid itself is notably  
25 reduced. A further advantage is founded in the fact that the length of cleaning is substantially shortened. The cleaning system is more rapidly ready for operation for the use of a further coating medium.

30 For sucking back of the coating medium from the feed lead, two possibilities have been identified as set out above. In one the medium is fed back via a by-pass lead containing

an additional suction pump functionally connected with the feed lead. In the second, the feed pump already present in the feed lead can be switched over to act as suction pump.

- 5 The invention is explained in more detail with reference to two embodiments shown in the drawings by way of examples only.

Figure 1 shows a printing press schematically, the press  
10 including two devices for coating printed material;

Figure 2 shows a first construction of the coating unit;

Figure 3 shows a second construction of the coating unit.  
15 Referring to Figure 1, this shows schematically a printing press constructed with several printing units 1, preferably offset printing units, in serial construction mode, wherein only the last one is shown. Downstream of this final  
20 printing unit 1, in the feed direction of the sheet materials to be printed, there are arranged subsequent to the printing units 1 a first device 2 and a second device 3, both for coating the printed material. Between devices  
25 2, 3 for coating the material to be worked on a drier unit 4 is arranged. A delivery 5 is arranged downstream of the second coating device 3, which is formed inter alia by a circulating chain system 7 which deposits the sheets on to a delivery pile 6. A printing unit 1 consists essentially  
30 of a plate cylinder 8, a blanket cylinder 9 as well as a sheet guiding cylinder 11, here an impression cylinder. Fitted to the plate cylinder 8 is an inking unit and if necessary there is furthermore a dumping unit adjacent the

plate cylinder 8 in respect of which however one does not need to go into more detail here and these are not shown in Figure 1. Between the printing units 1 and devices 2, 3 as well as the drying unit 4, there are arranged in each case  
5 a sheet guiding cylinder 10 as a transfer cylinder for transporting the printed material.

The first unit 2 for coating is constructed as a varnishing unit, e.g. for processing dispersion varnish with pigments  
10 on an aqueous basis, and consists of a sheet guiding cylinder 11 (impression cylinder), a forme cylinder 12 which can be brought into contact with the sheet guiding cylinder 11, which carries a flexible relief plate as a varnishing forme, and a first metering system 13. The  
15 first metering system 13 is formed by a rastered application roller which can be brought into contact with the forme cylinder 12 as well as a chamber doctor which is functionally connected to the applicator roller.

20 The second coating device 3 is likewise constructed as a varnishing unit, e.g. for processing dispersion lacquer on an aqueous basis, and in turn consists of a sheet guiding cylinder 11 (impression cylinder), a forme cylinder 12 which can be brought into contact with the sheet guiding  
25 cylinder 11, and which carries a blanket, and a second metering system 14. The second metering system 14 is formed by an applicator roller which can be brought into contact with the neighbouring forme cylinder 12 carrying the blanket, as well as a metering roller coacting  
30 therewith. Applicator roller and metering roller form a roller nip into which a lead system feeds the coating medium.

Both metering systems 13, 14 have a lead system connected to them for the circulation of coating medium.

Referring now to Figure 2, this illustrates a first  
5 embodiment of a lead system connected to one of the  
metering systems 13, 14. However, for ease of explanation,  
the mode of operation of the metering system 13 will be  
described in what follows. The housing of the chamber  
doctor is functionally connected with a lead system for the  
10 circulation of coating medium and has a central upper feed  
port to which is connected a supply line 20 for the supply  
of liquid coating medium from a reservoir 19. At the lower  
part of the housing of the chamber doctor are arranged two  
lateral emerging return leads 15,16 for feeding away of  
15 excess coating medium in the region of the side parts. The  
feed lead 20 is linked with a feed pump 22 arranged in the  
lead system. Arranged integrated into the return leads 15,  
16 in each case is a suction pump 17, 18 downstream of  
which suction pumps 17,18, the return flow leads 15,16 are  
20 connected together to form one return flow lead.

Alternatively the metering system 13 can also have one  
return lead 15 or 16 and a suction pump 17 or 18 arranged  
is the lead connects to a reservoir 19, which can be filled  
25 e.g. with a dispersion varnish.

In the construction shown in Figure 2, between the metering  
system 13, 14 and the feed pump 32, a by-pass lead 25 is  
arranged branching off from the feed lead 20. In Figure 2,  
30 the branching is effected by a T-piece, through  
alternatively a switching valve could be used. The by-pass  
lead 25 is linked with a suction pump 24 and after the

- suction pump 24, the by-pass lead 25 debouches into the reservoir 19 for receiving the coating medium. From the reservoir 19 via the feed lead 20 in turn, coating medium can be fed to the respective metering system 13. The feed
- 5 pump 22 is preferably a membrane pump and the suction pump 24 is likewise preferably a membrane pump. In this first embodiment as well as the reservoir 19, there is a cleaning agent container 23. A vegetable cleaning agent and/or water can be contained in the cleaning agent container 23.
- 10 The cleaning agent container 23 is connected on the lead side via a switching valve 21 with the feed lead 20, via a further switching valve 30 with the by-pass lead 25 and via a switching valve 27 with the return leads 15,16.
- 15 In the second embodiment in addition to the reservoir 19 and cleaning agent container 23, a further reservoir 26 is arranged with a second coating medium, e.g. UV lacquer. The reservoir 26 is linked on the lead side via a switching valve 29 with the feed lead 20, a further switching valve
- 20 31 with the by-pass lead 25 and via a switching valve 28 with the return lead 15,16.

The second embodiment of the invention, shown in Figure 3, will be described below with reference to a roller metering

25 system 14. As shown in Figure 3, the feed lead 20 feeds coating medium on to the nip between the applicator roller and the metering roller. Arranged on the sides of the roller nip are the return leads 15, 16 for feeding away excess coating medium. The feed lead 20 is linked with a

30 feed pump 22 which can be switched over to act as a suction pump. The coating medium is thereby directly returnable from the feed lead 20 into the reservoir 19 from which it

was fed. Preferably the feed pump 22 is constructed as a peristaltic pump which feeds the coating medium to the metering system 14 or (after switching over) via the actual feed lead 20 back into the reservoir 19. The switchable  
5 over feed pump 22 is constructed in a further development as a radial peristaltic pump.

Peristaltic pumps are, as is known, positive displacement pump units which are functionally connected with  
10 peristaltic action with bendable lead systems. In the present example, the feed pump 22 is functionally connected as a peristaltic pump with the flexible feed lead 20.

In turn in the return leads 15, 16 there is arranged in  
15 each case an integrated suction pump 17, 18, wherein after the suction pumps 17, 18 in the feed direction, the return leads 15, 16 are connected to form a single return lead. Alternatively, the metering system 14 can also have just one return lead 15 or 16 and a suction pump 17 or 18  
20 arranged on the lead side and is connected to the reservoir 19.

The switchable over feed pump 22 with peristaltic action and the suction pumps 17, 18 are linked by leads likewise  
25 with the reservoir 19 for dispersion lacquer.

Furthermore, a cleaning agent container 23 is arranged which is linked by means of lead system which debouches in the feed direction at a switching valve 21 prior to the  
30 feed pump 22 into the feed lead 20. In the return running direction in the return lead 15, 16, a further switching valve 27 is arranged which is connected via a lead to the

cleaning agent container 23.

In a preferred further development, as well as the reservoir 19 for dispersion lacquer, a further reservoir 26 is arranged for receiving UV lacquer. The reservoir 26 is linked by means of the lead system which debouches in the feed direction at a switching valve 29, prior to the feed pump 22, into the feed lead 20. In the return direction in the combined return lead 15, 16, a further switching valve 28 is arranged which is connected by means of a lead to the reservoir 26.

The mode of operation is as follows: in accordance with Figure 2, the liquid coating medium is fed from the reservoir 19 by means of feed pump 22 via the feed lead 20 to the metering system 13 or 14. If the metering system 13 being used is as a chamber doctor, then in the housing chamber, a slight excess pressure is achieved, the coating medium is transferred to the applicator roller and excess coating medium is fed via the suction pumps 17, 18 back into the reservoir 19. If the metering system 14 is used as a two roller unit (nip roller principle), then the coating medium is fed from the feed lead 20 into the roller nip and excess medium is fed by means of the suction pumps 17, 18 back into the reservoir 19.

Now if the feed lead 20 of the metering system 13 (or 14) and the return leads 15, 16 are cleaned, the feed pump 22 is rendered stationary and the suction pumps 24 activated in such a fashion that out of the feed lead 20, the coating medium located therein is fed back via the by-pass lead 25 into the reservoir 19. Simultaneously the residual coating

medium is transported from the return leads 15, 16 and the metering system 13 back into the reservoir 19. Only thereafter is the feed pump 22 actuated anew, the suction pump 24 is rendered stationary and the supply of the feed line 20 with cleaning agent from the cleaning agent container 23 can take place. The switching valve 21 being previously actuated, the feed pump 22 feeds the cleaning agent via the feed lead 20 to the metering system 13 (or 14) and via the return leads 15, 16, after activation of the switching valve 27, the cleaning agent is sucked back into the cleaning agent container 23. If via the feed lead 20 a second coating medium is fed out of the reservoir 26, the feed pump 22 is rendered stationary and via the by-pass lead 25 with the switching valve 30 actuated, the cleaning agent is sucked back into the cleaning agent container 23 by means of suction pump 24. Thereafter the suction pump 24 is rendered stationary, the feed pump 22 is actuated, previously the switching valves 29, 21 are actuated and the second coating medium can be fed to the metering system 13 (or 14). The suction pumps 17, 18 feed via the return leads 15, 16 and with actuation of the switching valves 27, 28, the coating medium back into the reservoir 26.

In accordance with Figure 3, again the liquid coating medium is fed by means of feed pump 22 via the feed lead 20 from the reservoir 19 to the metering system 13 or 14. If the metering system 14 is used, i.e. a two roller unit, the coating medium is fed into the roller nip, metered there and transferred from the application roller to the forme cylinder 12. Excess coating medium is fed via the suction pumps 17, 18 back into the reservoir 19. Now if a change of the coating medium is to take place or a cleaning



process, then the feed pump 22 is switched over, i.e. the feed pump 22 sucks the coating medium which is located in the feed lead 20 back into the reservoir 19. Then the feed pump 22 is changed over again and the provision of the feed  
5 lead 20 with cleaning agent from the cleaning agent container 23 can take place. Previously the switching valve 21 is switched through to clear. Once the cleaning process has ended, then the feed pump 22 is switched over anew, i.e. the feed pump 22 sucks the cleaning agent  
10 located in the feed lead 20 back into the cleaning agent container 23.

The same principle is applicable for the second coating medium located in the reservoir 26. After ending the  
15 cleaning process, the switching valve 29 is actuated, the feed pump 22 feeds the coating medium from the reservoir 26 into the feed lead 20, e.g. to the metering system 14. From there, excess coating medium is fed via suction pump 17, 18 back to the reservoir 26. If the feed of coating  
20 medium is stopped, then the feed pump 22 is switched over anew and the coating medium located in the feed lead 20 sucks back into the reservoir 26.

All switching valves 21, 27, 31 present are actuatable  
25 manually and/or starting from a press control and are constructed as 3/2 path valves (3 connection leads/2 switching positions).

The construction in accordance with the invention is not  
30 restricted to the metering systems 13, 14 described. Rather, the device is suited for coating printed material also for metering systems which have at least one scoop

roller dipping into a container (with coating medium) and an applicator roller. The feed lead 20 then debouches on the scoop roller or in the container and by means of at least one return lead 15 and/or 16 excess medium is

5 continuously or periodically sucked back into the corresponding reservoir, e.g. 19. For the cleaning process or on changing the coating material analogously to the system illustrated in Figure 2, the feed pump 22 is rendered stationary and via the by-pass lead 25 and suction

10 pump 24, it is sucked back into the reservoir, or analogously to the system illustrated in Figure 3, the feed pump 22 is switched over to suction operation.

CLAIMS

1. A device for coating printed material in a printing  
press formed by a counter pressure cylinder, a forme  
5 cylinder, at least one applicator roller with a metering  
system which can be set on and off the forme cylinder, a  
reservoir for coating medium, a circulating lead system  
drivable by means of at least one feed pump for circulating  
coating medium in the reservoir, and wherein between the  
10 metering system and a feed pump, whereby coating medium can  
be fed from the reservoir via the feed lead to the metering  
system, a feed lead is arranged having a by-pass lead  
including a twist suction pump enabling medium to be fed  
back to the reservoir, and wherein excess coating medium  
15 can be sucked off from the metering system via at least one  
return lead linked with a further suction pump into the  
reservoir.
2. A device according to Claim 1 wherein the feed pump is  
20 a membrane pump.
3. A device according to Claim 1 or 2 wherein the first  
suction pump is a membrane pump.
- 25 4. A device according to any one of Claims 1 to 3 and  
including a cleaning agent container which can be connected  
via switching valves to the feed lead, the by-pass lead and  
the return lead(s).
- 30 5. A device according to any one of Claims 1 to 4 and  
including a further reservoir which can be linked via a  
switching valve to the feed lead, via a further switching

valve to the by-pass lead and via a yet further switching valve to the return lead.

6. A device for coating printed material according to  
5 Claim 1 and substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

7. A device for coating printed materials in a printing  
press formed by a counter impression cylinder, a forme  
10 cylinder, at least one applicator roller with a metering system which can be set on and off the forme cylinder, a reservoir for coating medium, a circulating lead system drivable by means of at least one feed pump for circulating coating medium in the reservoir, and wherein between the  
15 metering system and the reservoir, a feed pump is arranged in a feed lead, which feed pump can feed the coating medium from the reservoir via the feed lead to the metering system and which can be switched over to act as a suction pump to enable coating medium to be fed back from the feed lead  
20 into the reservoir, and wherein the device includes at least one return lead linked with a suction pump for returning excess medium from the metering system to the reservoir.

25 8. A device according to Claim 7 wherein the feed pump which can be switched over to act as a suction pump is a peristaltic pump.

9. A device according to Claim 8 wherein the feed pump  
30 which can be switched over as a suction pump is a radial peristaltic pump.

10. A device according to any one of Claims 7 to 9 and including a cleaning agent container linked via a switching valve to the feed lead and via a further switching valve to the return lead(s).

5

11. A device according to any one of Claims 7 to 10 and including a further reservoir which is linked via a switching valve to the feed lead and via a further switching valve to the return lead(s).

10

12. A device according to Claim 7 and substantially as hereinbefore described with reference to Figure 3 of the accompanying drawings.



Application No: GB 9828229.6  
Claims searched: 1-12

Examiner: A J Rudge  
Date of search: 19 January 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.Q): B6C(CDA,CERK,CEBH,)  
Int Cl (Ed.6): B05C-1/08;B41F-23/08;B41F-7/06;B41F-31/02;B41F-35/04  
Other: ONLINE - EPODOC

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2 267 061 A (Marozzi)	

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
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